

Center for Quality Teaching and Learning

Computer Engineering Technology I and II

A complete process of learning and instruction

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Having worked with QTL for a number of years and being a proponent of their program, I have often been surprised at some teachers that don't grasp the importance and scope of this effort. For that reason, I have included in this paper a detailed outline of a process that I believe is "turn key" using the QTL methodology and curriculum. Understand that this is my process which may not fit all other teachers but I have had great success with the concepts I am about to outline. First some observations that you as a fellow teacher have probably made:

1. High School students need to take responsibility for their learning.
2. They must move from concrete learning of the past and become abstract learners.
3. Families play a major role in the direction of a learners view of their future
4. Some students do not relate learning and behavior in the classroom to skills necessary in the business world.
5. We educators are developing the student's knowledge of learning, their work skills along with values in the work place.

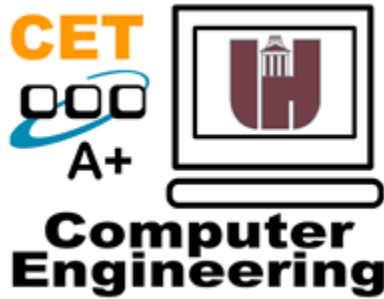
There are of course many more but these are the main five that I use to develop my instructional slant. From this list and reflecting on past educational years I have developed a set of overall goals for my Computer Engineering Technology classes. They are the corner stone of how I structure the class:

1. As Career and Technical Education teachers we should be providing our students with the tools that allow them to live and work in a culturally diverse world.
2. Not only should we be teaching specific technical skills but social and ethical skills.
3. We should aspire to integrate our technology programs into academic programs.
4. Accomplishing a Computer Engineering Technology class should be a worthy achievement involving relevance and rigor.
5. Students should be taught to go beyond stereotypical roles, social economic status and ethnicity to achieve at their potential.

With these items identified, we can begin to view the QTL program. I hesitate to call it a curriculum as it has more elements than standard information. The concept that all teachers in the QTL family are tied together and can work as a team is very powerful when you know what you are looking for. If you are a first year teacher and uncomfortable with the program or the curriculum it may seem daunting. To their credit, the program has never been a "turn-key" system. It does allow all types of teachers to

utilize the information and utilities to fit their situations while still holding true to the primary goals of the state mandated curriculum. For me, I use the QTL published web site www.qtlmoodle.org. This is a comprehensive source for worksheets, quizzes, tests, handouts, and other activities that are organized by objective topic. Many teachers also use this web site. It provides a single source for the student to know what will be expected in the classroom. It also can be used as a basic starting point by adding your own information and instructional aids. Research shows that information housed in a single location is easier for the student to understand and gives a structure to learning with the result being better more efficient knowledge transfer.

Using this one source I have developed an organizational framework around this site which allows for further knowledge transfer and easier student learning. My process involves the use of contracts. Using contracts is method that has been successfully used for a number of years. Each three week period I produce a contract for each student. This involves completing worksheets and activities from the web site, labs in the classroom and other extra activities that come up during the class. An example of this contract is shown on the next page. Again, this is for a three week period. The three columns can correspond to each three weeks. The three rows correspond to academic learning, hands-on learning and a third row for additional learning identified during that period of time. Starting out, each student will have the same contract. At the end of each contract (three week period) the student will take an evaluation test to show their achievement. Once completed and graded, the student and teacher sit down and review the three week period and discuss successes and areas that need improvement. Then a new contract is created for the next three week period which is created to work on skills the student needs improvement on and highlights areas that the student finds more enjoyable. Although it appears unique to the student, this new contract is one of three versions as I have found most students fall in one of three categories that can be identified. Low achievers that need more work in general, moderate achievers who are doing the work and achieving normal success, and high achievers who need more challenge in the class. This allows me to create three contracts for a specific time frame rather than one unique one for each person in the class. As well, the academic row really never changes on any of the contract versions. All students need to know the information contained on the web site. However, I can control the second row by modifying what labs each group completes. Finally, the last row allows me to be flexible and reward those students that are putting in the extra effort. An example of this is test corrections. Those students not receiving an "A" on the three week test will need to do test corrections. This would be one of the items on the third row of the new contract where those students receiving an "A" would get credit for that accomplishment. The beauty of this process is that upon receiving a contract the student is free to accomplish the learning necessary. That means that some may want to start with the web site learning and complete worksheets, others may want to complete a lab or finish test corrections. This allows the instructor to spend time with those students that need more one-on-one time. It also frees up the instructor to work with individual students on labs. It also means that all students are working in different areas at different times so if you have limited equipment for labs this will allow you to make better use of what you do have. It also allows you to move away from the traditional lecture method of teaching.



Work Contract: Session Number 5

Student Name: _____

The following nine objectives are activities that you need to complete and review with the teacher to determine your progress in this course. The nine items are broken into three sections that encompass research into each objective, classroom labs that expand on your understanding of the subject, culminating into activities that you select which further your mastery of the section. Each Work Contract is for a period of three weeks and must be completed and reviewed before the final day of the three week period.

Objective CE209.02 <input type="checkbox"/> 209.02WS1	Objective CE209.03 <input type="checkbox"/> 209.03WS1	Objective CE209.04 <input type="checkbox"/> 209.04WS1
<input type="checkbox"/> Lab 1: Dual Boot Computer _____ _____	<input type="checkbox"/> Lab 2: Computer Repair Contest _____ _____	<input type="checkbox"/> Lab 3: Networking Hacks _____ _____
<input type="checkbox"/> Your Choice: Test Revisions _____ _____	<input type="checkbox"/> Your Choice: Test Re-take _____ _____	<input type="checkbox"/> Your Choice: Crossword of your choice _____ _____

NOTE: The “Your Choice” option is determined by you the student. It should be an effort which is in line with the objective being addressed. Examples would include a PowerPoint or Report on a topic or person. Other options might include activities found in the web site or research project.

Contract 5 Due May 19!

Now you would only lecture to small groups who need more help or at unique times when you want to highlight a specific topic. Grading just became much easier as well because you can plan your cycles around the three week period. The big learning advantage that I see is that you are moving away from a time sensitive learning process. If the student needs more time on a specific topic you can modify the contract to take in that additional time on task. You will always have the constraint that the class is a specific length (in my case 18 weeks) but you can modify by objective, the length of time an individual takes in a specific area.

This also has direct links to the business world in that job requirements are normally not one isolated task but a group of tasks with a specific due date. The components are identified and assigned to an individual to complete. The contract works the same way. A group of components are identified and assigned a three week period to accomplish. However, if the class is not performing well with this concept (we have all had such classes) it is easy to drop back to a weekly requirement by having each column due at the end of each week. Using this method also provides for time at the end of the class duration to review. In my case, I added practice tests during the last week in class. Students had the time to work on labs, complete sample tests or work on areas they were weak on just before the final exam.

In general, I found this procedure to work well for me. It gave more time to work with others in all areas. More time to work with those that needed more assistance, more time to work with the advanced students and give them more rigor, and to bring that middle of the road student into accomplishing more than my previous methods. What was interesting during the class was that students would work as teams in the labs but those teams would change depending upon the content and how each student chose to spend his/her time. This allowed for a diversity that did not exist before. It also brought a degree of fun to the learning process in that students were encouraged to develop their own labs or "your choice" requirements. To that end I believe I achieved my goals stated above. The diversity and team work was evident in the lab participation. Students strived to complete the worksheets and did well on tests. The "your choice" component gave me the freedom to bring another dimension to the process in that I could create all manner of new components into the mix. One example of that is having the students develop their own computer support company. Students on one contract got credit for the "your choice" component by creating a support company. This would be a real company where they listed items they could do for people such as disk clean-up etc. Prices and marketing material were required and a presentation before the class was done to provide exposure to all. In fact, three of the students did start a small service of their own for family and friends.

With a minimal amount of work you can have a diverse educational experience for students which allow each to excel in this curriculum. True, I'm not saying that all students did excel as we know there are those that have been lost to education but I was able to reach more and still provide a very structured environment. I should also say that

I did not use a single text book but relied on the QTL moodle site. If needed, additional material was found on the web.